

Rare Earth Deposits Deck a Top Trumps-style game

About SoS RARE

SoS RARE, a project supported by the Natural Environmental Research Council UK (NERC) SoS MinEerals program, is a large interdisciplinary team carrying out research to better understand Rare Earth Element (REE) deposit types, and ensure REE are responsibly sourced. Research includes developing more efficient and environmentally-friendly ways to process REE deposits, and working on metrics to compare deposit characteristics.

Rare Earth Elements (REE)

The Rare Earth Elements (REE) are ubiquitous in modern technologies, including computers, low energy lighting, energy storage devices and large wind turbines, making their supply vital to our ever growing technological society and the development of a low carbon economy. The grade (low-high) of each REE element is indicated for each deposit.

La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
high	Dy	Ho	Er	Tm	Yb	Lu	Y
low							

Notes

The values given for each category are estimates based on the simplification of relevant factors from available sources, and should not be taken as an economic assessment or comment on environmental performance of the deposits or companies. For information on the allocation of values, please see the accompanying scoring sheet.



Rare Earth Deposits Deck - Instructions

Game Play

2 - 6 players

Deal all the cards face down between the players.

Each player holds their cards face up in a pile so that they can see the top one only.

The player to the left of the dealer selects a category and reads out the value of that category on their card.

In turn, each of the other players reads the same value from their top card. The card with the best value in the chosen category wins.

The winning player takes all of the cards and places them to the bottom of their pile, then re-starts the game by choosing a category from the new top card in their hand.

If two or more cards share the top value, all of the cards from that round are placed in the middle and the same player chooses again from the next card.

The winner of that round then takes the cards from the previous round in addition to those he/she has won.

The player with all the cards at the end of the game is the winner.

Variations

Players can look at all of their cards and select the best one from their hand to play each time.

Timed version – whoever has the most cards at the end wins.

Bonus points for collecting all sites from one country/continent.



Araxá - Brazil



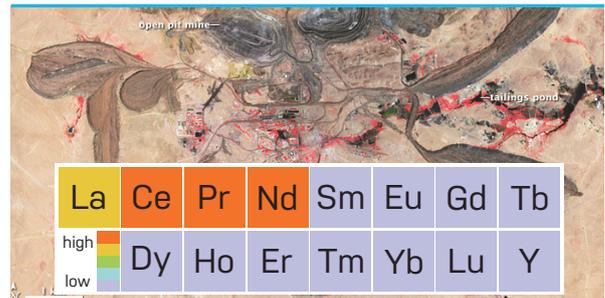
La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
high	Dy	Ho	Er	Tm	Yb	Lu	Y
low							



Deposit size	5
Accessibility	5
Radioactivity	3
Environmental score	5
Production stage	4
Political stability	4
Proportion of "rarest" rare earth elements	2



Bayan Obo - China



La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
high	Dy	Ho	Er	Tm	Yb	Lu	Y
low							



Deposit size	9
Accessibility	5
Radioactivity	2
Environmental score	2
Production stage	4
Political stability	3
Proportion of "rarest" rare earth elements	2

Rare Earth Deposits Deck - Categories

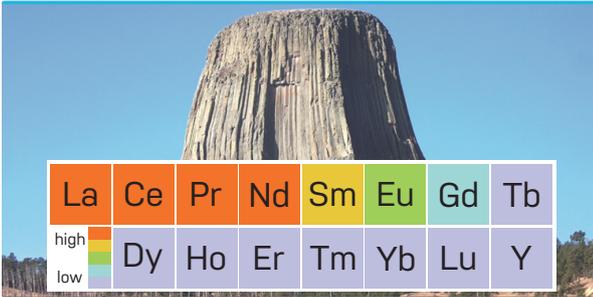
Deposit size	Scored 1 - 10 (highest wins) based on published resource data (amount of estimated REE ore content in the deposit).	
Accessibility	Scored 1 - 5 (highest wins) based on the proximity to road, rail, ports for transporting to market.	
Radioactivity	Scored 1 - 10 (LOWEST wins) based on the radioactivity of main REE ore present.	
Environmental score	Scored 1 - 10 (highest wins) based on environmental democracy index, grade, and implementation of environmental standards.	
Production stage	Scored 1 - 4 (highest wins) to reflect the current (2017) progress. 1 = exploration stage; 2 = mine design and planning; 3 = in construction; 4 = in production	
Political stability	Scored 1 - 10 (highest wins) based on the 2017 political climate of the country, including government/local attitudes to mining.	
Proportion of "rarest" rare earth elements	Scored 1 - 10 (highest wins) to reflect the heavy REEs that are the least abundant in nature (e.g. Dy use in wind turbines).	



Rare Earth Deposits - locations



GeoBus Bear Lodge - USA

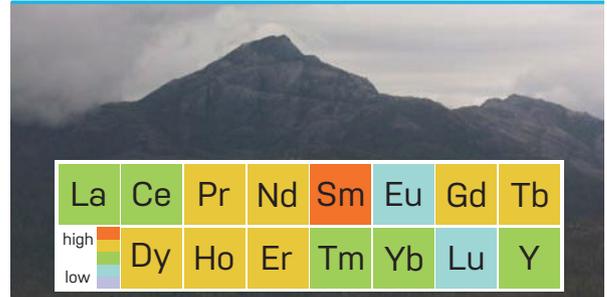


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Deposit size	6
Accessibility	3
Radioactivity	3
Environmental score	7
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	2

GeoBus Bokan Mountain - USA

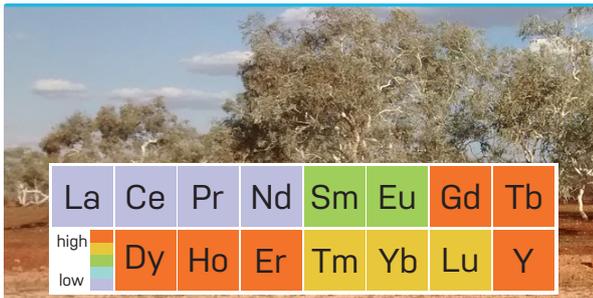


SOS RARE 2020 KYAKE

NERC SCIENCE OF THE ENVIRONMENT

Deposit size	1
Accessibility	3
Radioactivity	3
Environmental score	6
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	7

GeoBus Browns Range - Australia



SOS RARE 2020 KYAKE

NERC SCIENCE OF THE ENVIRONMENT

Deposit size	1
Accessibility	2
Radioactivity	4
Environmental score	3
Production stage	3
Political stability	8
Proportion of "rarest" rare earth elements	9

GeoBus Dubbo Zirconia - Australia



SOS RARE 2020 KYAKE

NERC SCIENCE OF THE ENVIRONMENT

Deposit size	3
Accessibility	4
Radioactivity	3
Environmental score	3
Production stage	3
Political stability	8
Proportion of "rarest" rare earth elements	5



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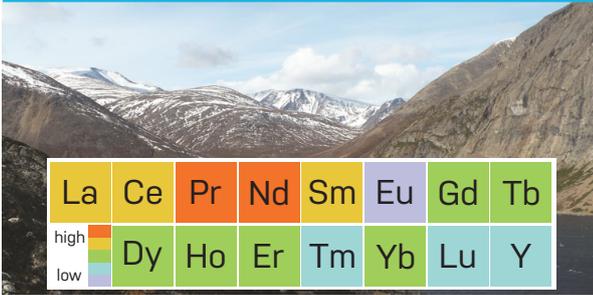


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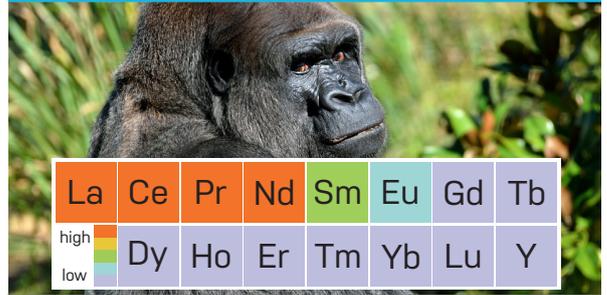




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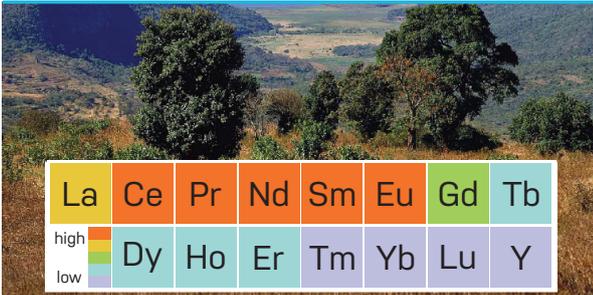
Deposit size	2
Accessibility	3
Radioactivity	3
Environmental score	3
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	5



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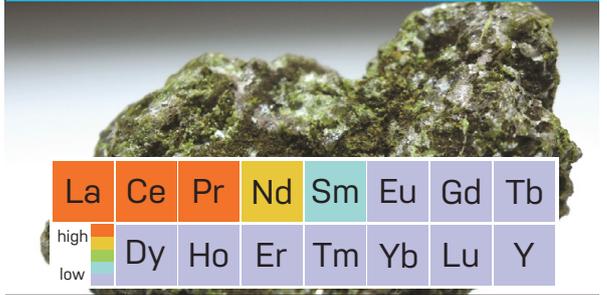
Deposit size	1
Accessibility	2
Radioactivity	2
Environmental score	7
Production stage	4
Political stability	3
Proportion of "rarest" rare earth elements	2



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Deposit size	2
Accessibility	4
Radioactivity	3
Environmental score	7
Production stage	2
Political stability	4
Proportion of "rarest" rare earth elements	3



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NERC SCIENCE OF THE ENVIRONMENT

Deposit size	1
Accessibility	3
Radioactivity	1
Environmental score	4
Production stage	1
Political stability	4
Proportion of "rarest" rare earth elements	2



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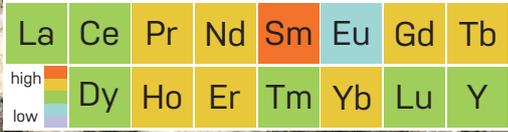
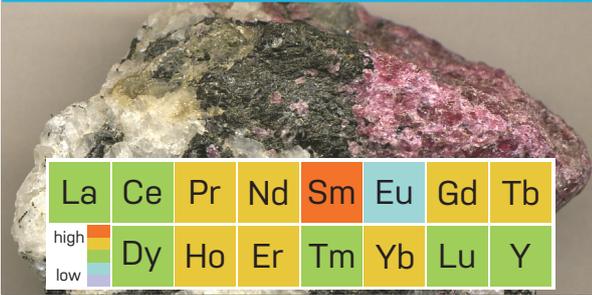
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GeoBus Kipawa - Canada

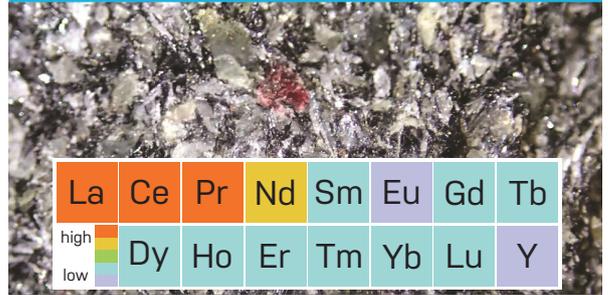


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Deposit size	2
Accessibility	4
Radioactivity	1
Environmental score	3
Production stage	1
Political stability	8
Proportion of "rarest" rare earth elements	6

GeoBus Kvanefjeld - Greenland

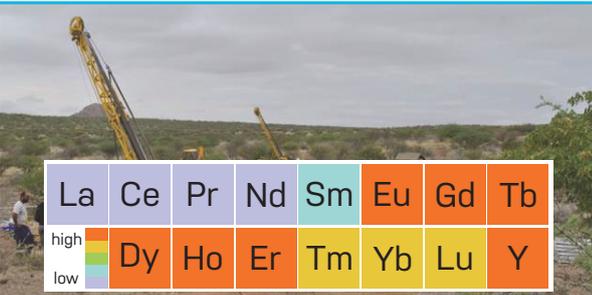


SOS RARE 2020 KYKE

NERC SCIENCE OF THE ENVIRONMENT

Deposit size	8
Accessibility	2
Radioactivity	5
Environmental score	3
Production stage	2
Political stability	7
Proportion of "rarest" rare earth elements	4

GeoBus Lofdal - Namibia

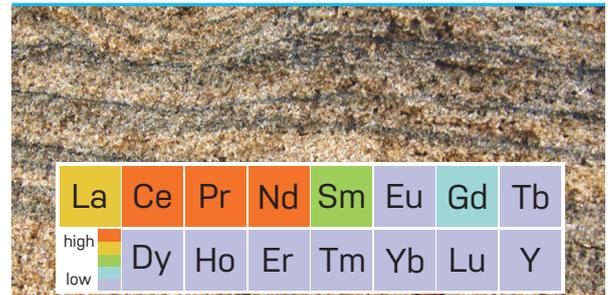


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NERC SCIENCE OF THE ENVIRONMENT

Deposit size	1
Accessibility	3
Radioactivity	3
Environmental score	3
Production stage	1
Political stability	6
Proportion of "rarest" rare earth elements	9

GeoBus Mineral Sands - India



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NERC SCIENCE OF THE ENVIRONMENT

Deposit size	4
Accessibility	4
Radioactivity	6
Environmental score	3
Production stage	4
Political stability	6
Proportion of "rarest" rare earth elements	3



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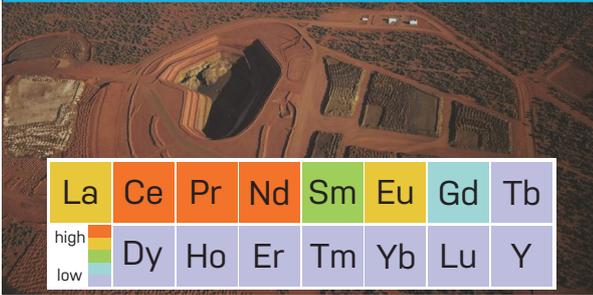
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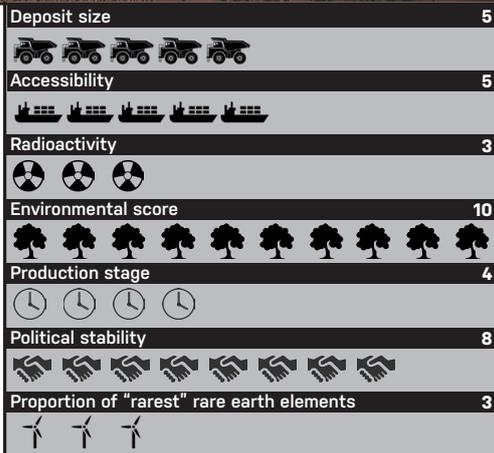


GeoBus Mount Weld - Australia

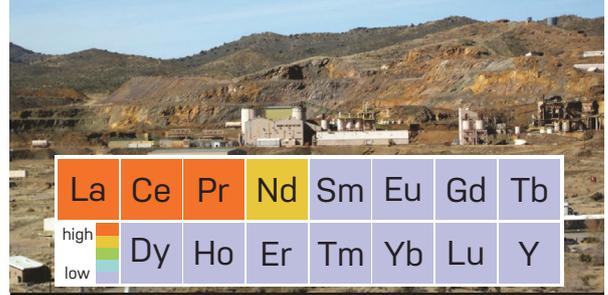


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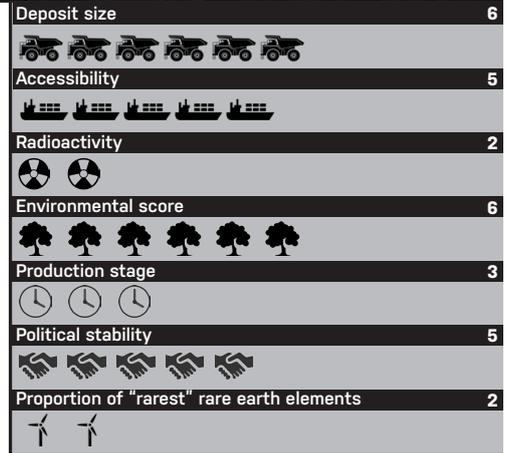


GeoBus Mountain Pass - USA

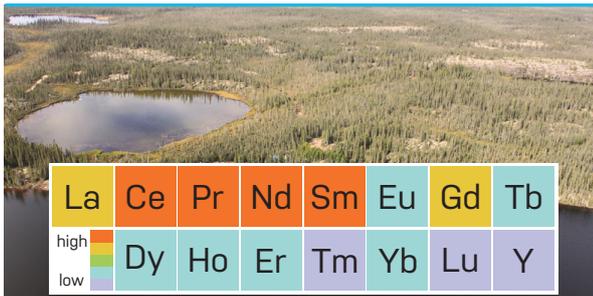


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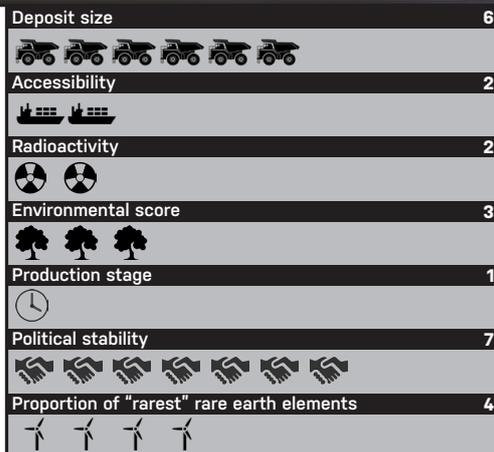


GeoBus Nechalacho - Canada

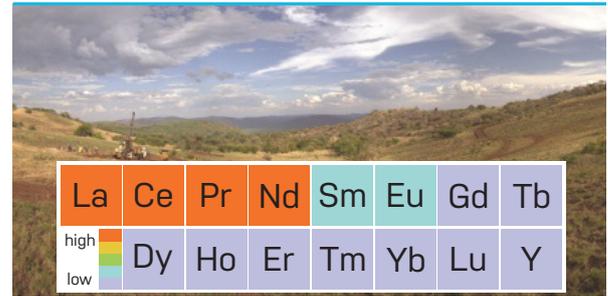


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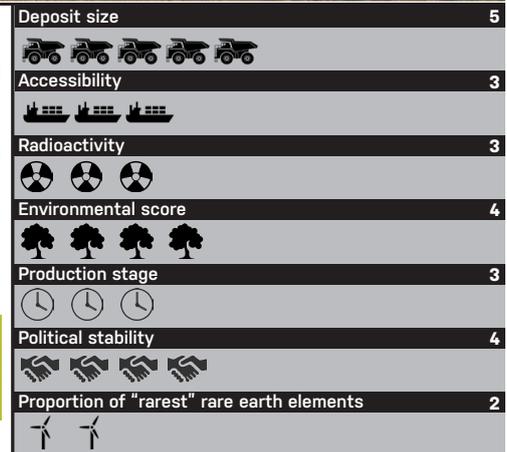


GeoBus Ngualla - Tanzania



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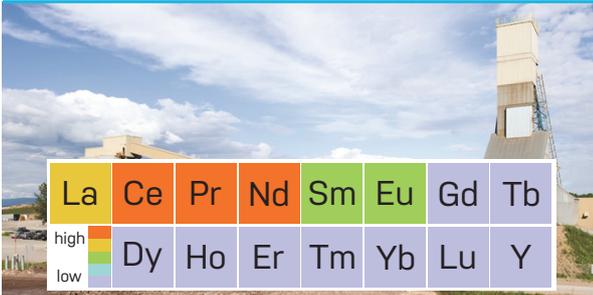
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GeoBus St Honore - Canada

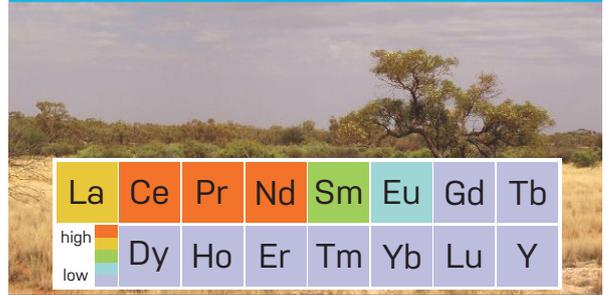


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SCIENCE OF THE ENVIRONMENT

Deposit size	9
Accessibility	5
Radioactivity	2
Environmental score	3
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	2

GeoBus Nolans Bore - Australia

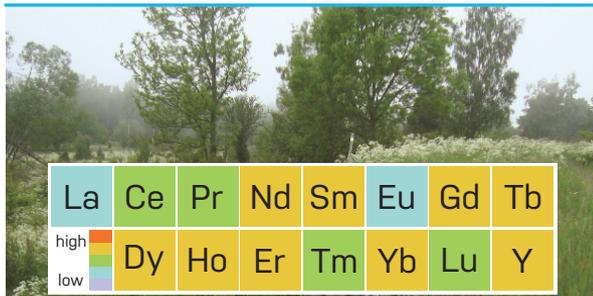


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SCIENCE OF THE ENVIRONMENT

Deposit size	4
Accessibility	3
Radioactivity	3
Environmental score	3
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	2

GeoBus Norra Kärr - Sweden

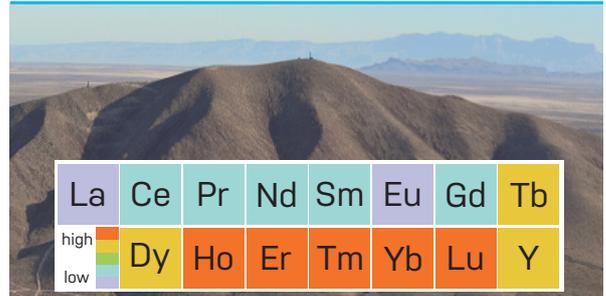


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SCIENCE OF THE ENVIRONMENT

Deposit size	1
Accessibility	5
Radioactivity	1
Environmental score	3
Production stage	3
Political stability	5
Proportion of "rarest" rare earth elements	7

GeoBus Round Top - USA



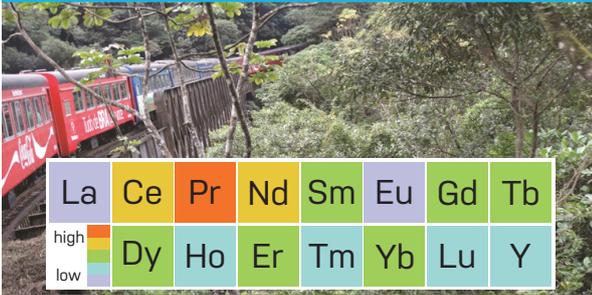
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SCIENCE OF THE ENVIRONMENT

Deposit size	1
Accessibility	4
Radioactivity	5
Environmental score	6
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	9



GeoBus Serra Verde - Brazil



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NERC
SCIENCE OF THE ENVIRONMENT

Deposit size	4
Accessibility	3
Radioactivity	1
Environmental score	4
Production stage	2
Political stability	4
Proportion of "rarest" rare earth elements	5

GeoBus Songwe Hill - Malawi

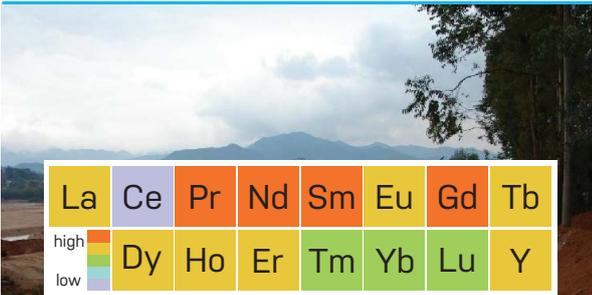


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NERC
SCIENCE OF THE ENVIRONMENT

Deposit size	3
Accessibility	3
Radioactivity	3
Environmental score	3
Production stage	3
Political stability	4
Proportion of "rarest" rare earth elements	4

GeoBus South China Clays - China

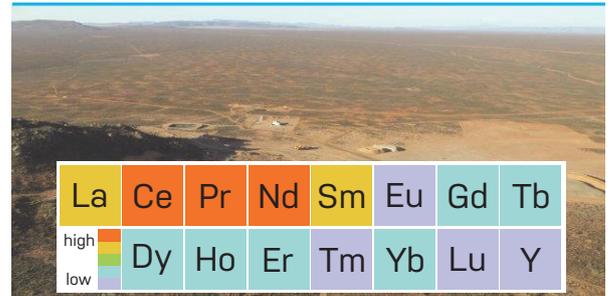


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KAYE

NERC
SCIENCE OF THE ENVIRONMENT

Deposit size	6
Accessibility	4
Radioactivity	1
Environmental score	1
Production stage	4
Political stability	4
Proportion of "rarest" rare earth elements	8

GeoBus Steenkampskraal - South Africa



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Deposit size	1
Accessibility	4
Radioactivity	6
Environmental score	9
Production stage	2
Political stability	4
Proportion of "rarest" rare earth elements	3



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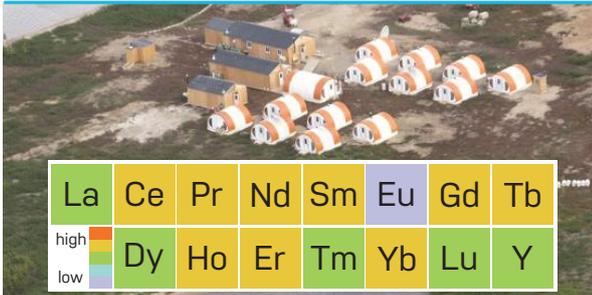
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GeoBus Strange Lake - Canada



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Deposit size	8
Accessibility	1
Radioactivity	2
Environmental score	3
Production stage	1
Political stability	8
Proportion of "rarest" rare earth elements	6

GeoBus Tanbreez - Greenland

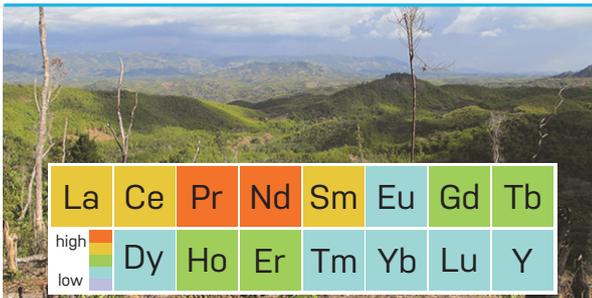


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Deposit size	10
Accessibility	1
Radioactivity	1
Environmental score	3
Production stage	1
Political stability	7
Proportion of "rarest" rare earth elements	6

GeoBus Tantalus - Madagascar

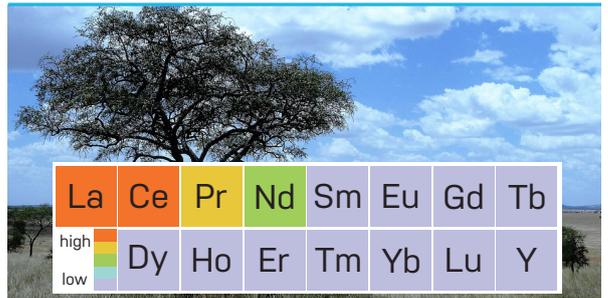


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Deposit size	3
Accessibility	2
Radioactivity	1
Environmental score	2
Production stage	2
Political stability	4
Proportion of "rarest" rare earth elements	5

GeoBus Wigu Hill - Tanzania



SOS RARE EARTH
2022 RANKING

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Deposit size	1
Accessibility	3
Radioactivity	3
Environmental score	4
Production stage	1
Political stability	4
Proportion of "rarest" rare earth elements	2



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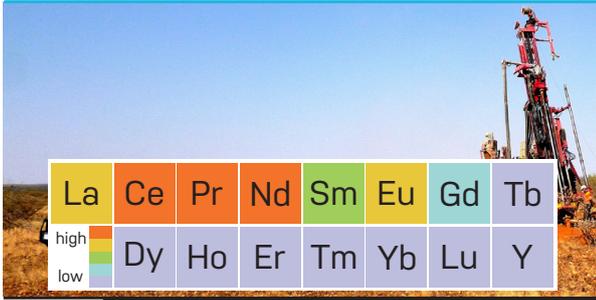
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GeoBus Yangibana - Australia



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Deposit size	1
Accessibility	3
Radioactivity	4
Environmental score	3
Production stage	2
Political stability	8
Proportion of "rarest" rare earth elements	3

GeoBus Zandkopsdrift - South Africa



SOS RARE
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Deposit size	2
Accessibility	4
Radioactivity	4
Environmental score	7
Production stage	2
Political stability	4
Proportion of "rarest" rare earth elements	3



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